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"A Gardeners' Problem."

IN the latest number of the *Gardeners' Chronicle* received here the editor announces that the entertaining, though somewhat roving, discussion which has covered whole pages of our valued contemporary ever since the year began, is now brought to a close "in the absence of any new evidence on either side." Since the reverberations of the controversy have been heard in our own columns, it may not be inappropriate to state just what this "Gardeners' Problem" is which has aroused the botanical talent of the old world into such general activity. The *Kew Bulletin* for December last contained an important report by our correspondent, Mr. Watson, on tropical and sub-tropical plants grown in the open air in southern Europe, and this was prefaced by a note in which Mr. Dyer, Director of the Royal Gardens, said: "Horticulture is essentially an empirical art. Botanical science can afford little *a priori* information as to the cultural conditions which any plant will require or tolerate; these for the most part can only be found out by trial and experience." This paragraph was pronounced by Dr. Masters as discouraging to those who believe that practical horticulture has a right to look to vegetable physiology and anatomy for guidance and for profitable suggestion, and he added that the statement of Mr. Dyer was too absolute. These, so far as we now remember, were the most positive declarations ventured on either side, and the various disputants assumed positions somewhere between these extremes, and usually about equidistant from each. The problem, from its nature, does not admit of demonstrative reasoning, and therefore remains unsettled. This fact, however, does not deprive the discussion of a genuine value, for each writer endeavored to illustrate some phase of the question by examples of plants in actual cultivation, so that a body of experience has been collected which will prove of assistance to all who are interested in the practice or theory of horticulture.

In studying the argument in the case of Empiricism *vs.* Botanical Science, it may be worth while to remember that knowledge is knowledge, whether it is acquired by cultivating plants or by studying them in some other way. Any one who attempts to build a sustained argument based upon the assumption that knowledge which is practical can be separated by a distinct line from knowledge which is scientific, will be likely to come to grief. We do not mean by this that there was a general confusion of terms in the discussion of this gardeners' problem, but it seems like drawing a rather fine distinction when it is said of an author that he speaks as a gardener on one page and as a botanist on the next, and that in the one case his utterances, drawn from the stores of his empirical knowledge, are helpful to the cultivator, while in the other case his counsel, based on scientific knowledge, has no practical value. When it is stated that the gardener who has a genius for his work will "naturally hit upon the right method" of cultivation; and again, that the good gardener will "know instinctively" what treatment to apply in a given instance, this means that the gardener has been doing just what the man of science would have done if he had been engaged in research in the same field. He has been making deductions, classifying, generalizing. What is called his instinct is the result of reasoning from data gathered by observation, and his conclusions may be strictly logical, although he has never thought of formulating them.

In regard to the general question it may be said that in this country there are some persons who are apprehensive that farmers and gardeners will be unfitted for the practice of agriculture and horticulture if they are subjected to instruction in the sciences related to these arts. The foundation of so many agricultural colleges, with chairs of horticulture, would seem to indicate, however, that what the country at large is afraid of is not too much science, but too little. It is true that very many of the marked advances in agricultural and horticultural practice have been made by actual workers in the field who have found by experience that certain methods and processes could be improved upon. These steps forward have not been due, as a rule, to men of science, but it is equally true that science has always been ready to present the reasons for the change, and in this way to suggest the most hopeful lines for further improvement. It seems to our people that a man who knows why he adopts a given method of cultivation is likely to be a more practical cultivator, less likely to fail in the essentials of the practice, than one who blindly follows the rule of thumb. Horticulture and agriculture, too, are no doubt largely empirical arts; but we sympathize with Dr. Masters in the belief that the addition of scientific knowledge will help to place them on a foundation more sure and productive than that of individual experience.

We cannot expect that every farmer and gardener will become an expert in vegetable physiology, but it is reasonable to hope that intelligent cultivators will acquire so much of the elements of the science as are set forth, for example, in Professor Johnson's treatise, "How Crops Grow," and there need be no fear that the little knowledge thus gained will prove a dangerous thing. Neither farmer nor gardener needs to be so well schooled in chemistry that he can make a quantitative analysis of a soil, or of a food ration, or of a fertilizer; but he should know enough of this science to be an intelligent student of the current literature of the experiment stations. Indeed, one can hardly visit a farmers' institute in this country without hearing the more successful farmers talk intelligently about nitrogen, phosphoric acid and potash, or of carbohydrates and albuminoids, and these farmers will testify that this elementary knowledge has directly improved their practice. The students of mycology and entomology have rendered incalculable benefit to horticulture by discovering remedies for plant-diseases and destructive insects, and the gardener and farmer are certainly better equipped for an encounter with the black rot of the Grape or with the curculio, if they know enough of the history and habits of fungus or insect to understand why a given method or a given season is selected for the application of the remedy. And so we might go through the entire list of sciences related to horticulture, and fail to discover one, an elementary

knowledge of which would not prove of distinct advantage to the gardener or farmer.

There are, no doubt, gardeners, as there are men in other walks of life, whose practice is hampered or misdirected by what they think they know; but it is hardly fair to lay the blame for such failure at the door of science.

Legislation Against the Gypsy Moth.

WE believe that the bill looking toward the extermination of this insect, now before the Massachusetts Legislature, should receive favorable consideration. The caterpillar of the Gypsy Moth is known to be a destructive pest in the gardens and orchards of Europe, and it has evidently, within the twenty years since its unfortunate introduction into Medford, obtained a firm foothold, and unless it is repressed, it will perhaps spread throughout New England and the Northern and Central States. The amount of $25,000 asked of the General Assembly will, a few years hence, seem a not extravagant sum, should the insect be at once exterminated, a matter not difficult of accomplishment, if the suggestions made by Professor Fernald in his pamphlet issued by the Massachusetts Experiment Station are carried out.

The chief value, however, of this particular measure would be that it might lead to the passage of a general act against insect depredators. Massachusetts has been liberal in the publication of illustrated works on injurious insects, such as Harris' Treatise on Insects, and the amounts expended in this direction have been a good investment. The General Government, too, has made liberal grants to the State Experiment Stations; but unless the people of each state cooperate in applying the practical remedies against these pests, they will continue to be an exhaustive drain on the resources of farmers and fruit-growers. Had the Legislature of Massachusetts in the early part of the century passed acts, with suitable appropriations, against the tent-caterpillar and canker-worm, how much desolation of orchards and loss of shade-trees might have been prevented! Even now, every June as one travels from Boston to Portsmouth, or in any direction from Boston, he beholds ravaged orchards and leafless trees, which look as if a fire had passed through them. A few orchards are saved, and it has been again and again demonstrated that with a little care and slight expense an Apple orchard can be easily preserved from the attacks of caterpillars. But when a few keep these pests away by the use of simple preventives, their careless neighbors take no precautions and suffer their shade-trees and orchards to be worm-ridden. The result is that the worms are transported by the winds over fences from infested Elms; the females climb over fences, and thus vitiate the best laid plans of the more public-spirited planters. A law compelling the indifferent or careless to co-operate in staying and preventing the ravages of these pests might accomplish a great deal toward reducing their numbers. And why should there not be legislation against insect pests, as well as game-laws or dog-laws or acts against allowing cattle to run at large or permitting noxious weeds to go to seed?

Whatever may be the tendency to over-legislation in our country, it is a reasonable course to compel every landholder to co-operate in preventing these insect ravages; for if the owners of leafless orchards and defoliated shade-trees are permitted to maintain insect-nuisances, they will defeat every effort of their more enterprising neighbors who are willing to take measures for protecting their trees.

The Cypress of Montezuma.

THERE appeared not long ago in these columns (volume iii., page 2) an account of the deciduous Cypress (*Taxodium distichum*), with a view of a swamp in southern Indiana covered with a forest of these trees surrounded by their peculiar root growths, the so-called Cypress-knees.

The illustration on page 155 of this issue represents the trunk of a tree of the same species and one of the most interesting and best known trees in America, the "Cypress of Montezuma," the largest of the famous Cypress-trees in the gardens of Chapultepec, near the City of Mexico, and a noted tree nearly four centuries ago. It belongs to the same species as our deciduous Cypress of the Southern States, which extends southward through some of the high valleys of Mexico nearly to Guatemala, growing in these southern stations in comparatively dry ground, and without producing the knees which characterize the more northern trees, the inhabitants of deep swamps and inundated river banks. The "Cypress of Montezuma" is a tall and still graceful tree, rising to a height of 170 feet, with a trunk to which different travelers have ascribed a girth varying from forty to nearly fifty feet, the discrepancies in the measurements being due, no doubt, to the different points above the surface of the ground at which they were made. It stands near the hardly less famous spring, the "Bath of Montezuma," the source of the water supply of the Aztec capital, to which it was carried on a splendid aqueduct of 900 arches.

The tree of Montezuma is only one of a number of individual Cypress-trees growing in different parts of Mexico, famous for their antiquity, their vast dimensions and the historical associations which cluster about them. Distinguished naturalists* have examined their history and computed their age, which, in the case of the "Cypress of Montezuma," has been estimated to be about seven centuries; while that of the larger tree of Santa Maria del Tule is believed to be nearly 2,000 years old. This tree, the largest deciduous Cypress of which there is any authentic record, stands in the centre of the village of Tule, on the road from Oazaca to Guatemala by the way of Tehuantepec, within the enclosure of the parish church, and is a conspicuous object from all the country round. The measurements of this tree given by travelers vary a great deal, and it is difficult to compare them satisfactorily, as they generally lack precise information of the exact manner in which they were made. The latest measurements of this tree which we have seen were made a year ago and are as follows: Circumference of the trunk five feet from the ground, following all its sinuosities, 146 feet; actual circumference five feet from the ground, 104 feet; total height of the tree, 150 feet; longest diameter of the trunk, forty feet; shortest diameter of the trunk, twenty feet; spread of branches, 141 feet.

Hardly less famous than the Cypress of Santa Maria del Tule is the Ahuehuete of the village of Atlisca, near Puebla, of which the worthy Archbishop wrote three centuries ago, as quoted by Gray: "The cavity of the trunk might contain twelve or thirteen men on horseback; and that in the presence of the most illustrious Archbishop of Guatemala and the Bishop of Puebla more than a hundred boys entered it." This tree, according to Humboldt's measurements, had in his time a trunk girth of sixy-six English feet, the cavity of the trunk being about sixteen feet in diameter.

"El Arbol de la Noche triste," the Tree of the Night of Sorrow, another of the great Mexican Taxodiums, stands in the little village of Popatela. It marks the spot where the soldiers of Cortez went down like sheep before the Aztec hordes, their backs to the foe. The trunk of this tree girths about sixty feet, and although the top and many of the branches are in a state of advanced decay, the tree still rises above the little church close to which it stands and which was built to commemorate the battle.

Our illustration of the trunk of the "Cypress of Montezuma" is made from a photograph taken by Miss A. L. Rotch, of Boston, to whose kindness we are indebted for its use.

Holiday Notes in Southern France and Northern Italy.—XIII.

NEARLY twenty miles south-west of Nice is the pretty town of Cannes, a wonderful horticultural centre. The principal promenade is that of La Croisette, which, as far as the beauty of the trees is concerned, is preferable to the famous Promenade des Anglais at Nice. Date Palms alternate with *Platanus acerifolia*, and here and there large Oleanders are thriving between their more majestic neighbors. The Planes do remarkably well close to the sea. Apparently self-sown, high up in the chinks of rocks and walls on the way up to Mont Chevalier, *Solanum glaucum* was perfectly at home, growing very freely and flowering abundantly. From the top of the hill just named a series of fine views are obtained, especially of the Iles de Lérins, in the largest of which, Ste. Marguerite, that mysterious individual—the man with the iron mask—was confined from 1686 to 1698. In our own times, Marshal Bazaine

* Humboldt, "Essai Polit. Nov. Esp.," ed. 2, ii., 54.—A. De Candolle, in *Bibl. Univ. de Genève*, xlvi., 392.—A. Gray, "Scientific Papers," ii., 113.

was imprisoned here from December, 1873, until his escape in August of the following year.

Orange-trees are largely grown at Cannes, principally for their blossoms; the real centre of the Provençal perfumery distillation is, however, at Grasse, about a dozen miles inland from Cannes. Cassie (*Acacia Farnesiana*) is also extensively cultivated on the hills outside Cannes; the plants are kept pruned in like large gooseberry-bushes.

One of the glories of Cannes is the beautiful *Acacia dealbata*, which, as described so charmingly by Alphonse Karr, has "for leaves the finest ostrich plumes, and for flowers great golden thyrses." Enormous quantities of the flowering branches of this species are forwarded during the winter months to the Paris, London and other markets, and as the flowers stand traveling well and last a long time, they can be bought at a cheap rate from the costermongers in the streets of London and the neighboring towns. The soil of Cannes is a micaceous schist which suits this Acacia admirably; at Nice and elsewhere along the Riviera, wherever limestone abounds, it obstinately refuses to grow. According to Alphonse Karr, a line a yard wide, drawn between the territory of Nice and that of Cannes and St. Raphael, marks the boundary where the soil suddenly changes in character; on one side of this line the Acacia in question luxuriates in company with tall Heaths (*Erica arborea*)—three yards and upward in height—which in January are covered with white blossoms, exhaling a perfume that partakes of the character of vanilla as well as that of bitter almonds. On the Nice side of the line neither this Acacia nor Heath can even be made to grow.

Fine Stone Pines and Cork Oaks form striking objects in the Villa-gardens on the hill-sides, and in uncultivated ground the underwood is Myrtle, Heaths, spiny members of the Broom family, Smilax, Phillyrea, Lentisk, *Lonicera Caprifolium*, Cistus, etc.

Solaignac's establishment on the "Californie Hill" is the most important and best managed of the gardens mainly devoted to the culture of plants on a large scale for cut flowers. Terrace after terrace—many of them only just broad enough for the long houses filled with Roses, etc.—are kept up by stone walls and rise in long series one above the other. Peaches, grown as bushes, gave promise of a fine crop of fruit, and underneath them were planted such things as *Iris Susiana*, *Gladiolus Colvilli* and other bulbous plants with showy flowers. Large quantities of Mignonette were coming on—sown toward the end of August, the seedlings had four or five leaves the third week in September and would begin to yield a crop of flowers in December.

The favorite Carnation was "Enfant de Nice," a sturdy, compact grower, with fine flowers, white, with a blush-colored centre. The two Strawberries grown by Solaignac are Victoria and Dr. Morère. Probably some of the readers of GARDEN AND FOREST will remember the fine dishes of the latter variety exhibited at Paris—in the horticultural exhibition from May 24th to May 29th, in connection with the exposition—and the statement written on the card, that the fruit had borne a journey of about 630 miles.

The Roses were nearly all Teas, and were planted out on the terraces above mentioned. During the summer months the lights are taken off and are only replaced at the end of September. Comparatively little pruning is necessary, the long, vigorous shoots being tied down in a more or less horizontal position. Some 8,000 lights were piled in blocks at the time of our visit; the supports and framework of the houses—at any rate, those in which the Roses were grown—were made of pitch pine, unpainted. Excellent arrangements, some of them very ingenious, existed for a copious water supply on all the different levels in this thirsty spot, and everything evinced the pride the proprietor feels in his garden. Not a weed was to be seen, and all the plants were healthy and well grown.

After leaving Cannes, we passed St. Raphael in a ravine on the coast. Then comes a romantic rocky district with numberless Mulberry-trees and vineyards in which Phylloxera was playing sad havoc. The Olives were pollarded as in Languedoc, and looked stiff and formal in comparison with the beautiful trees on the Italian Riviera. Fields of Tuberoses just coming into flower were passed here and there. Along the coast heaps of snowy salt marked the spots where in the low, marshy grounds the sun's rays had been utilized for procuring this necessity of life from the sea-water by evaporation.

But my holiday was nearly over, so a comparatively short stay was made in Marseilles; another stop at Lyons, not long enough to make my scattered notes worth recording here, and then a rush to London to resume duty after nearly a month's absence.

Kew. *G. Nicholson.*

Entomological.

A Newly Imported Rose Saw-fly

(*Emphytus cinctus*, L.)

ONE of the natural and inevitable results of the great increase in importation of plants, bulbs, etc., from foreign countries is the introduction with the plants of some of the insects which live upon them. These insects may also be introduced in other accidental ways, and, like some foreign weeds, it frequently happens that the immigrants thrive better and prove more troublesome in their new surroundings than in their native home.

The importation of an additional enemy of the Rose has now to be recorded, and whether or not it is to be as troublesome as some of its predecessors remains to be proved. In the summer of 1887 I found a number of Saw-fly larvæ, which I had never observed before, on the under side of the leaves of several species of Rose at the Arnold Arboretum and on a few horticultural varieties of the Rose in some gardens in the vicinity. In the following summer and autumn the larvæ were quite plentiful, and they were found in the Botanic Garden at Cambridge as well as in the Arboretum and other gardens in Boston. I do not know how much further their present range extends, but it may be safely stated that in the localities mentioned, and where the injuries by Saw-fly larvæ were noticeable during the seasons of 1888 and 1889, fully one-half of the defoliation of the Rose-bushes was caused by this imported species, the remaining portion of the injury being chiefly the work of the well known Rose-slug (*Selandria Rosæ*, Harris).

The difference in the character of their depredations may be readily seen, as the larva of the imported Saw-fly generally begins at the edge and eats all parts of the leaf to the thick part of the midrib, whereas the Rose-slug usually devours the green tissues of the leaf only, and leaves a more or less perfect skeleton of it. The larva of this newly imported Rose saw-fly also has the habit, when at rest on the under side of the leaf, of curling up its body into a close spiral or ball, with the anal segments resting on the middle part of the body, a position never assumed by the common Rose-slug.

The fully grown larva is about three-quarters of an inch long, smooth, cylindrical and tapering slightly from the head. The head is dull yellowish orange in color, with a brownish or blackish stripe down the middle of the top, and with black eyes. The color of the body is a metallic green above, though sometimes pale; and the lower part of the sides, the under side of the body and the legs are grayish white. Above the spiracles there is a dark spot, which, in some stages of the larva, appears as a dark stripe along each side of the body; and there are other spots close above the legs.

It was not until the autumn of 1888 that a few perfect saw-flies were raised from these larvæ, and, at first being supposed to be a native species, it was some time before they were identified. Finally, after reference to descriptions of European species, there seems to be no doubt that this is *Emphytus cinctus*, L., a species known to occur over the larger part of Europe and to extend into Siberia.

The color of this Saw-fly is shining black; antennæ, black; thorax with two very small white points (cenchri) behind the second pair of wings; abdomen, a little longer than the head and thorax together, and, besides a somewhat triangular white blotch behind the thorax, there is a conspicuous yellowish white band on the fifth segment of the females, which is absent in the males. This white band does not quite encircle the body, but terminates abruptly after passing around the sides, leaving the middle of the under side of the segment black. Of the legs, the femora or thighs are dark brown or black, with white on the upper part; and the tibiæ are whitish at the apex, the rest of the tibiæ and the tarsi being reddish. The length of the largest specimens (females) is about three-eighths of an inch, and the wings, which are transparent, expand five-eighths of an inch or slightly more.

The ordinary observer may instantly distinguish these insects from the common Rose Saw-fly by their much larger size (two to three times as large) and this white band on the body of the female. They are also much more active than the common black species, of which Dr. Harris says ("Insects Injurious to Vegetation," p. 525), "when touched they draw up their legs and fall to the ground."

The eggs are deposited singly on the under side of the leaves. The Saw-flies may be found hovering about the Rose-bushes early in May, and some larvæ continue to feed until late in October. There are certainly two, possibly three, broods during the season.

Curiously enough, this insect has been considered by some

European observers as a Rose stem-borer, because the larvæ have been found in Rose stems; and, in a "Rose Supplement" to the *Gardeners' Chronicle* for July 7th, vol. viii. (1877), a figure (Fig. 8) is given of this insect under the name of the "Rose stem-boring Saw-fly," in which the Saw-fly itself is well represented, but the figure of the magnified larva shows that it must belong to some other species, as it is covered with bristles or hairs, whereas the larva of *E. cinctus* is smooth. The truth seems to be that the fully grown larvæ, in search of suitable places in which to undergo their transformations, often select the pithy part of the Rose-branches and stems where they have been pruned off and exposed. They never bore independently through the hard, woody part of the stem, and never go deeply enough into the pith to cause serious injury to the stems of the plant. Like the Cornel Saw-fly recently noticed (vol. ii., p. 520), they also select very soft or decaying wood in which to hibernate and pupate. As is the case with many other species of Saw-flies, this one is said to be parthenogenic. Fortunately, the remedy for this possibly troublesome pest is easily procured and applied, and thorough applications of hellebore at the right times will clear the bushes of all larvæ.

The insect was described and well figured by the late Dr. S. C. Snellen von Vollenhoven (*Tijdschrift voor Entomologie*, viii. [1865], p. 73, pl. 3), and a translation of the text by J. W. May was given in the *Zoölogist* (Newman's) for 1870, p. 1,993. In Europe an ichneumon, *Cryptus emphytorum*, Boie, is known as a parasite of this Saw-fly. *J. G. Jack.*

Arnold Arboretum.

New or Little Known Plants.

Aster ptarmicoides.

THIS pretty little Aster, of which a figure appears on page 153—the first which has been published of it—is hardly kown in gardens, although, while it is not one of the showiest of the American Asters, it is one of the prettiest and most graceful of them all, and therefore well worth a place in the herbaceous border or in the rock-garden. It is especially well suited to plant among the crevices of rocks, for its natural place of growth is in such situations where it is found from western New England to Minnesota, and then westward to the Saskatchewan country and the mountains of Colorado.

Aster ptarmicoides is a dwarf, rigid plant, the wiry stems varying in height from six to twenty inches, or growing rather taller when planted in rich garden soil. The leaves are lucid on the two surfaces, linear, or the lower ones somewhat spathulate, and three or four inches long. The flowers, which are produced in corymb-shaped cymes, are white.

Aster ptarmicoides was discovered by Mr. Thomas Nuttall near Fort Mandan, on the Missouri, before it was known to be an inhabitant of New England. Botanists have had different views in regard to this plant at different times during the last fifty years, and it has been referred by them to no less than six different genera. A taller and more slender variety of this plant (var. *Georgianus*) has been found in north-west Georgia and in Arkansas.

Foreign Correspondence.

London Letter.

THIS week has been one of extremes as regards weather. It began with a heavy fall of snow accompanied by a sharp frost, until the thermometer fell to ten degrees, or twenty-two degrees of frost. So low a temperature in March has not before been known here within the last fifty years. Wednesday, the fifth, brought a south-west wind and sunshine, and on Thursday the temperature at midday was fifty-five degrees in the shade. Whilst a little cold was wished for to check too forward vegetation, so much as twenty-two degrees when fruit-trees are in bud and even in flower means disaster.

Amongst the plants now in flower at Kew the following are noteworthy:

TACCA ARTOCARPIFOLIA.—This is a most remarkable stove-plant. Tacca is a genus of about nine species, three only of which are known in cultivation: *T. (Ataccia) cristata*, recently noted in GARDEN AND FOREST; *T. pinnatifida*, enonomically interesting, its tubers being described as "resembling new potatoes" and the fecula from them being known as South Sea Arrowroot (it is also largely used in the same way as Sago for puddings, etc.); *T. artocarpifolia* is the largest of the three. From its tuberous root-stock spring numerous leaves on stalks three or four feet long, the blade two feet across and divided into stalked pinnatifid segments. The flower scapes are erect, six feet high, and each one bears a whorl of leafy bracts surrounding a cluster or umbel of numerous green-brown flowers, which are stalked and elegant in arrangement. Probably the most attractive feature is the numerous long arching brown filaments which spring from amongst the flowers and hang over Medusa-like. This species is a native of Madagascar. It requires plenty of moisture, rich soil and a tropical temperature all the year round. It is not what one would call beautiful; still from its elegant, stately appearance and the extraordinary character of its inflorescence it should rank amongst select plants for cultivation in large stoves.

GODWINIA GIGAS.—I noted this plant when it flowered at Kew last year, and merely mention its flowering again now because hitherto it has not flowered two years in succession. Until the introduction of *Amorphophallus Titanum* Godwinia was far and away the most gigantic of all cultivated Aroids.

CHAMÆDOREAS.—More than thirty species of Chamædorea are cultivated at Kew, both in the small houses and in the large Palm-house, where they are effective as well as useful as undergrowth to the large Tree-Palms in the beds. They are even more ornamental in a house devoted almost exclusively to Tree-Ferns, large Aroids and the most striking of the *Marantaceæ*, the Chamædoreas being planted amongst the large leaved Anthuriums and Philodendrons for the sake of contrast and elegance. In addition to the feather-like charm of their foliage there is also the decided beauty and delicious fragrance of their flowers, which are developed freely at this time of year on branching, drooping spikes, in clusters below the head of leaves. In some of the species the flower spikes are not unlike those of the Meadow-Sweet and are quite as elegant. In others, as for instance *C. Ernesti-Augusti*, the female plants bear long unbranched spikes with numerous bright red flowers, the whole spike afterward changing to a coral-red color. Few people think of growing Palms for the sake of their flowers, owing to the fact that most of these plants can never grow to flowering size in ordinary plant houses. But Chamædoreas are exceptions in this respect, as they flower when less than six feet high; indeed, *C. tenella* and *C. pygmæa* are the most diminutive of Palms, flowering and fruiting when only a foot high. *C. scandens* and one or two others are remarkable as climbing species, a character which renders them available for clothing large pillars or growing against the trunks of the largest Palms.

CAMELLIA RETICULATA.—A very fine bush of this large flowered species is now one of the chief attractions in the winter garden at Kew. Camellias have, as a rule, little to recommend them except the stiff symmetry and color of the flowers, but this big flowered species differs from them sufficiently to gain the admiration of the most artistic of flower-lovers. Along with size—for the flowers measure as much as nine inches across—there is the charm of looseness and elegance in the curve and arrangement of the petals, in which characters no two flowers are alike. Then the color, a deep rosy red, with the bunch of golden stamens showing through here and there, is most attractive. The leaves are stout and leathery, not shining, whilst the conspicuous reticulating nerves give them a character by which the plant is easily recognized. According to Mr. Hemsley the proper name for this plant is *C. spectabilis*. It has been in cultivation here about fifty years.

CANTUA DEPENDENS.—There is no more beautiful greenhouse climber than this, but it has a bad reputation in gardens because of its generally falling a prey to red spider and rarely flowering well. When fortunately situated, however, it makes a magnificent show whilst in flower, its elegant trumpet-shaped, bright red flowers hanging in loose corymbs from almost every branch. The finest example I have ever seen was growing against the back wall of a lean-to greenhouse with a south aspect, the Cantua being planted in a border of peat at the foot of the wall. It flowers in the spring. A plant of it is now in flower in the conservatory here.

A NEW HYBRID PHAIUS, raised by Mr. N. Cookson, of Newcastle, its parents being *P. Wallichii* and *P. tuberculosus*, is, perhaps, the most interesting Orchid in flower in England at the present time, which is saying a good deal for an Orchid, a hybrid, too. But the plant is of exceptional beauty, both in color and form, whilst in constitution it appears to have inherited the sturdiness and free-growing character of the female parent, *P. Wallichii*. We believe that it is only three years since the seeds were sown from which the plants now flowering

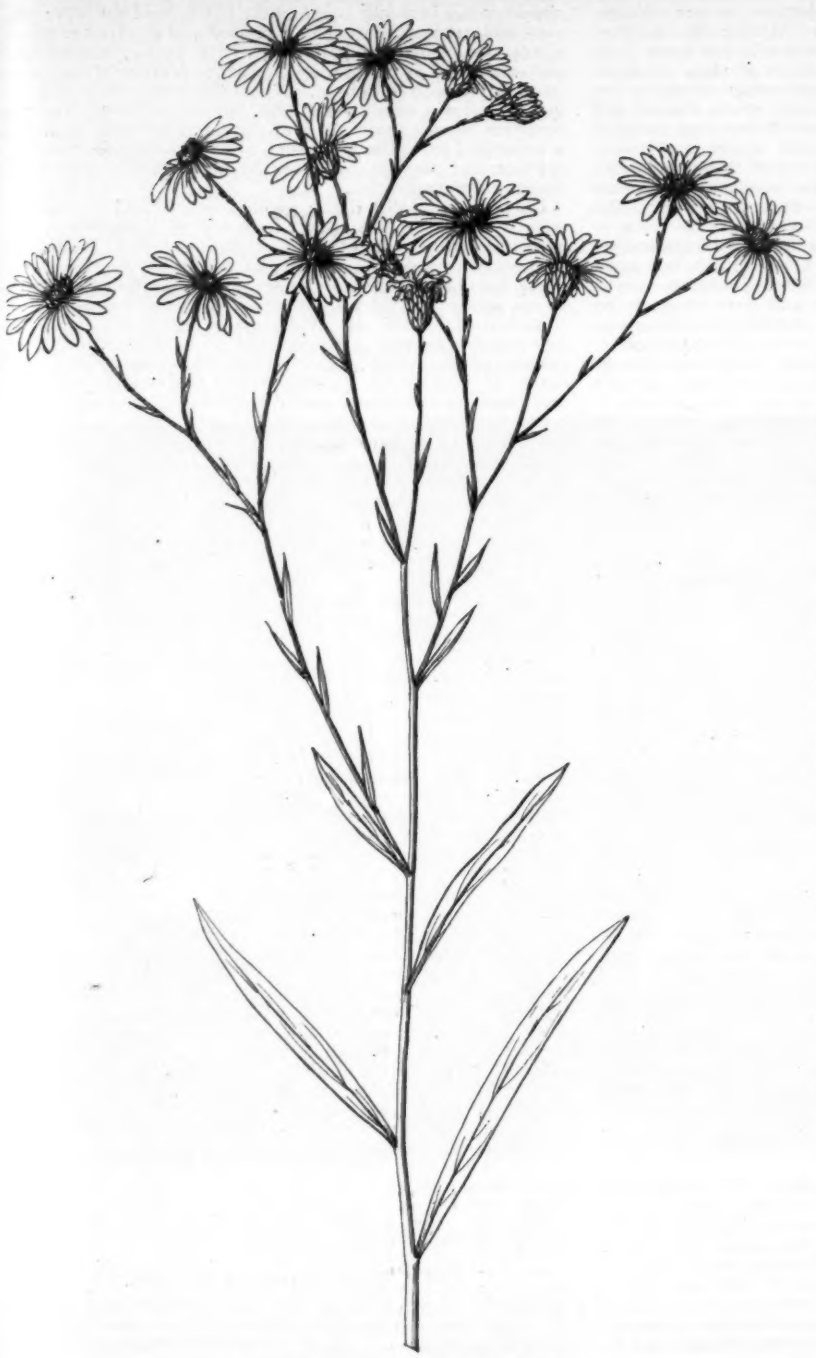

Fig. 27.—Aster ptarmicoides.—See page 152.

were raised, and that they have grown vigorously is shown by the strength of the flower-spike and vigor of the foliage. An inflorescence recently sent to Kew by Mr. Cookson had a scape a foot long, and it bore five flowers which were fully four inches across, the segments similar in form and arrangement to those of *P. Wallichii*, two inches long, half an inch wide, their color pale rosy salmon shaded with brown. The lip is almost campanulate, spurless, two inches long, three-fourths of an inch across the mouth, with a tongue-like lobe nearly an inch long, wavy and crisped along the margin. Its color is apricot-yellow, changing to deep crimson in the upper part, whilst the lobe is purple with a yellow line running down the middle from throat to apex. The column is white.

CYMBIDIUM LOWIANUM.—Two gigantic specimens of this noble Orchid, both good varieties, the one bearing thirteen spikes with 320 flowers, the other 211 flowers, nearly every one expanded, have just been sold at auction for twenty-eight guineas and thirty guineas respectively. It is rarely that one meets with such perfect examples as these were. They were in pots about one foot three inches across, and the soil they were growing in was a strong loam simply. Although one of the easiest of Orchids to cultivate, yet this Cymbidium does not always flower satisfactorily. It is an open secret that both plants were purchased for the great establishment at St. Albans.

C. LOISE CHAUVIERI.—A plant under this name was offered at the same sale, and although a small example with a single growth, the sum of forty-two guineas was refused for it. The name is said to be Reichenbachian, though there does not appear to be any record of its having been published. Mr. Sander sold two plants of it, the only others known to exist, to Sir Trevor Lawrence about eight years ago, but they have not yet flowered. In the sale catalogue it is described as "a large flowered scarlet variety from Madagascar, the finest new Orchid in existence." A Cymbidium with large scarlet flowers would be a grand addition to garden Orchids. Meanwhile we may note that there are no species of Cymbidium hitherto recorded from Madagascar, a fact which, however, goes for very little, seeing how few of the plants of the interior of this island are known. *W. Watson.*

Kew.

Cultural Department.

The Cantaloupe.

OF the various members of the Gourd family, those which interest us generally are the plants which supply our tables with delicacies, of which the Cantaloupe has the greatest number of admirers, and, in the estimation of some, it has no equal among our summer fruits. To constitute perfection, the fruit should be removed from the vine shortly before it is ripe; it should be washed with soap and cold water, then dried in a soft towel, and set to ripen in a dry place. A Cantaloupe that before washing smells like a potato, will in a few hours begin to give out an inviting perfume, and when this odor has reached its proper measure and character is the time to cut the melon.

My own ideal melon is of the size and form of a large ostrich-egg, with a thin, finely-netted rind, thick, grass-green flesh, a small seed cavity and a sweet, aromatic flavor. Some fifty years or more ago there was introduced into this market a small, green-fleshed Cantaloupe known as the "Centre Melon," which, for a time, excelled in richness of flavor all of its competitors. It was flat in form, grooved and finely netted; but it was too little to suit the ideas of the trucker, and therefore had to be made larger by hybridization with other flat varieties of greater diameter but inferior flavor. This Centre Melon was the progenitor of the Jenny Lind variety named about 1846; but where it came from no one now appears to know. I am inclined, however, to believe that it originated in the East, and possibly in the table-land of Armenia, where netted, green-fleshed melons are produced in abundance, some of which are flat, and where the same perfect flavor is to be met with. These Armenian melons

belong to a hardy race, are quite productive in our climate, and can stand it quite as well as any of our own kinds; they are as yet entirely unknown to our seedsmen, but have been grown under the severe test of the season of 1889. In form they are flat, globular or oval, the last being seven inches long, and all are fine-grained, thin-rinded, green-fleshed and closely netted, the last an unusual feature in our own varieties last year. This oval Cantaloupe has come nearer to my ideal than any one I have yet tested, and I hope to give it a better trial this coming summer. As Oriental seeds always come mixed in the packages, it will take time to separate the varieties by selection. As I have discovered Erzeroum, in Armenia, to be a great melon centre for both Cantaloupes and Watermelons that are calculated to stand our hot summers, it is to be hoped that our enterprising seedsmen will take steps to secure a full line of seeds, and particularly since my twenty-six kinds of Watermelon seeds were all lost in the wet ground.

The Cantaloupe has largely multiplied in its varieties in our country of latter years, and we have now those that are white-fleshed, yellow-fleshed, red-fleshed and salmon-fleshed. We have also netted, toad-marked and smooth fruits, with green, yellow and whitish rinds. Attempts have been made to grow the winter varieties of Naples and Malta, which may be ripened from Christmas to Easter, but as yet with no encouragement. The large green melon of Naples is the best and grows in boggy land, but has thus far failed when planted in the same form of soil in Florida, under my directions.

In size the Cantaloupe varies as much as in quality, and the extremes of weight are a few ounces and fifty-two pounds, the largest being coarse-grained and somewhat fibrous in texture. Up to twenty or twenty-five pounds fine-grained fruits are produced, especially of the green-fleshed varieties. The largest imported kind was introduced from Portugal, and of native varieties, was brought recently from Colorado, both at their maximum weighing over fifty pounds, and being as large as very large Watermelons. For a combination of large size and fine quality, perhaps no imported variety ever equaled the Persian melon grown for many years in the vicinity of Washington City, under the name of the Hunter Cantaloupe, a long, golden, closely netted fruit, with green flesh, reaching twenty inches in length and a weight of twenty-five pounds. This must not be confounded with the Casaba or Smyrna melon, often erroneously called Persian, the seeds of which were sent to the United States by Dr. Goodell, now of Philadelphia, on several occasions when residing in Constantinople.

Persia is a land of melons, from which we have had, as far as known to me, but four varieties of Cantaloupe, two of which are still produced, and no Watermelon. Who now grows the Ispahan Cantaloupe of the late Bayard Taylor, or the Persian melon of our late President, Mr. Mitchell? These may still exist as hybrids; but in their original character they are unknown here. Travelers praise the melons of Persia, write about them and throw the seeds away. Missionaries and American physicians have occupied the garden-spots of the land of Ahasuerus for half a century; have sent thousands of letters home, and have often visited their own land in person, but where are the Apricots, Quinces, Melons and Pomegranates of their introduction?

My own Cantaloupe tests have been made with seeds from France, the north and south of Italy, Tripoli, Turkey, Turkistan, southern Russia, Russian Georgia, Cappadocia, Armenia, the Valley of the Euphrates, Palestine and Japan. Many melons that are excellent in France and northern Italy will not grow in our climate on account of the heat; those from the land south of Naples do fairly well, but their quality for the table is inferior. The toad-marked melons of northeastern Italy under repeated tests have always failed, and so have our netted varieties in the cooler parts of that peninsula. Worms and bugs appear to delight in the flavor of the delicate foreign vines, and if the plants should in part escape their ravages, their leaves droop under the sun, and the fruit is not worth cutting. There is something very peculiar in the effects of soil and climate in the production of growth and flavor that we cannot understand. That seeds from cool countries should fail here, and that those from some hot countries should not, we can understand; but why varieties from other hot countries, having a good soil and cold winters, should utterly fail in quality of fruit when it, to a certain degree, grows well, we cannot explain. Of all foreign seeds, I have never seen any that grew so exactly in all respects like our own as those from the world's centre, the ancient land of Ararat, now called Armenia.

Cantaloupes may be divided into two classes: one that ripens to the best advantage in the house, and the other on the vine and exposed to the sun. Netted and grooved melons, as a rule, attain their finest flavor in the house, and should be pulled as soon as the green color at the bottom of the grooves has fairly begun to lighten. If a netted melon is pulled a little too soon it will keep a long time but never ripen, and some varieties when apparently well matured will only go to decay if separated from the vine; such are not favorite sorts with the trucker, but may be improved by hybridization with such as ripen more readily.

Cold nights, cold, damp ground and a mild temperature, with very little or too much rain, are all antagonistic to the growth and maturing of our Cantaloupes. Cold ground, with in the day a moderately warm sun, will cause a large melon to grow flat at the bottom and very convex at the top; the flesh of the upper part will also be much thicker and better flavored than that of the bottom. This rule of flavor is a general one, and a generous way to divide a melon is to cut it through the middle of the ground spot, either crosswise or through the stem and flower ends. In seasons like that of last year, melons only become about half netted for want of sun, and are poor in flavor when considered ripe; vast quantities brought to market never ripened. The melons from my Armenian seeds were exceptional in being densely netted.

Although the pollen of a Cucumber flower is capable of ruining the flavor of a Cantaloupe, it is very rare for a hybrid to be produced. I have seen such, between a Cucumber and a Jenny Lind melon, which was a decided curiosity. A noted Palestine Cucumber, known as the Mukte's, is produced upon a vine that very closely resembles in leaf and color that of a Cantaloupe; still, the fruit is an old variety of Cucumber and quite distinct from any of our sorts. The long Banana Cantaloupe makes a curious hybrid with the Jenny Lind, the product being oval, yellow, almost free from netting, very fragrant and salmon-fleshed; it has a better flavor than the former, but is quite inferior to the latter.

In Armenia there grows a Cantaloupe, probably of large size, to judge by the seeds, which is so sensitive to the heat of the sun that the gardeners are in the habit of covering the young melons with earth until they reach a certain size, when they are uncovered; this variety will be tested the coming season in several localities. The seeds are very large and white, much larger than any we have, and resemble those of the curious yellow Cappadocia melon introduced by me several years ago and not now grown; it was long, flat, smooth and salmon-red fleshed, like the Banana Cantaloupe in all points except in its shape.

Some years ago a few winter Cantaloupes were grown in this latitude, but the measure of success did not encourage the grower to continue the experiment; still, I see no reason why other attempts should not be made. American visitors to Naples are willing to pay sixty cents for a green melon in winter, and speak of it as wonderfully fine; in fact, it is the finest Neapolitan variety, and ought to be grown in some southern state, if possible, as a new industry. If the Naples melon will not succeed, the Malta green one should be tried. These melons are put away in the fall before they begin to ripen, and kept in a cool place. When one is to be ripened it is hung up in the open air in a warm place, in a net or a little bundle of straw, as bottles are sometimes encased for packing. The Naples seeds are very large, but of a form that ought to grow; the dry soil varieties may do better in our country. —*From an Address before the Pennsylvania Horticultural Society, by Dr. Robert P. Harris.*

Orchard Experiences.—III.

THE relative value of the different methods of propagating fruit-trees is frequently discussed, but often from a too narrow and local experience. In southern Maine, for instance, nearly all the fruit-growing farmers habitually denounce root-grafted and low budded trees as worthless; and "New York trees," even from the best nurseries, are looked upon as frauds all over northern New England. It is needless to say that this is unjust; but the feeling, neverthless, exists, is very wide spread, and has its basis on what is supposed to be a general experience.

The approved method of propagating Apple-trees in southern Maine is to grow seedlings in a nursery up to four or five years, to select the most thrifty for planting in the orchard, to set them out, and three or four years later top-work them, by grafting or budding in the limbs. This produces a tree that satisfies the requirements of that region; and the same process is in vogue in all southern New England, though low worked trees are not much objected to in Massachusetts, Connecticut or Rhode Island.

In northern New England and the eastern provinces of Canada the case is again quite different. Here experience has shown that not one Apple-seedling in a hundred, grown from seeds of fruit brought from lower New England, will survive the test winters. In these sections root-grafted or very low budded trees have exclusive preference, upon quite as solid grounds of experience as top worked trees in southern Maine. If top working is ever successful in the "cold north," it must be a double working—the stocks being first root grafted or low budded to some "iron-clad" variety and then reworked in the branches after they have been established in the orchard.

It may appear strange that such diverse views should prevail over what may seem not a very wide extent of country. This extent is greater, however, than many suppose—the extreme distance between the St. Lawrence River and Long Island Sound covering between seven and eight degrees of latitude, with a difference in winter climate as great as that between New Jersey and South Carolina.

In the Apple-growing region of Maine, extending but little more than fifty miles back from the sea-coast, Apple-seedlings from home grown seed are usually hardy enough to be used in the orchard for top-working successfully such varieties as the Baldwin, Rhode Island Greening, Northern Spy and Roxbury Russet, which are the leading commercial Apples of that section. Not one of these Apples, nor of such fall varieties as Gravenstein and Porter, are hardy enough, except quite near the coast of western Maine, to endure the climate when worked low. So grown, the young trees suffer in the trunk from the hard winters, and become unsound and unprofitable in a very few years. This explains why "New York trees" have so bad a name there; and the same is the case with the strip of country of about equal width, extending west from Maine to Lake Champlain.

South of this belt, in southern New Hampshire and Vermont and in the three lower states, low worked trees are again available. The only other section where the conditions of southern Maine are encountered is in the upper Champlain Valley. Here, again, the great commercial Apples named must be top worked to be enduring; but elsewhere in northern New England and in the provinces a climate is reached in which not even top-worked Baldwins, Greenings, etc., can endure the winters. Here an entirely different class of Apples is called for, and the ill repute of "New York trees" is due, not to the way in which they are worked, but to the tenderness of the varieties offered. Root grafted or low budded Oldenburghs, Wealthys, etc., succeed well; and were it not for the misrepresentations or the ignorance of those nurserymen who are sending out such insufficiently hardy kinds as Mann, Pewaukee or Wolf River, root grafted trees of the "iron clad" varieties would find a large market there. In fact, considerable quantities of New York grown Oldenburghs, Tetofskys, Wealthys, Scott's Winters and Yellow Transparents are now sold there, although the dealers, well aware of the old and strong prejudice, declare them to be home grown.

As all this ignorance, and consequent prejudice, is injurious, alike to the growers and planters of trees, it well behooves all those of the former class to inform themselves thoroughly about the hardiness of every variety they grow. As their location deprives them of practical experience on the subject, they ought to study the reports of the local horticultural and pomological societies. There is a rich mine of knowledge to be found in the reports of Iowa, Minnesota, Wisconsin, Ontario, Quebec and Maine; and every commercial orchardist in those sections, as well as every nurseryman desirous to supply the "cold north" with trees of a quality that will enable them to hold their trade, has need of it. It is quite as necessary to know what will not, as what will answer to plant in every county where a sale is sought. There are no better trees than those grown in the New York nurseries, but a sort of supercilious attitude in a few of them stands in direct antagonism to their own interests as well as to those of their patrons.

T. H. Hoskins.

Newport, Vt.

Fig. 28.—The Cypress of Montezuma.—See page 150.

Notes on Hardy Ferns.

Asplenium Filix-fœmina is one of our most common northern Ferns, and one of the easiest to transplant. It varies much according to the location. In rich soil, along the margins of swamps, it is frequently over three feet high, with fronds nearly a foot wide; while in other localities, and in poor soil, it is often only eight or ten inches high, with fronds proportionately narrow. These forms are all very beautiful, and seem to thrive in moist soil in either sun or shade. The variety *angustum* of this species has narrow, erect fronds, though often two feet

high. It is quite distinct in outline from the common type and much rarer.

Another Spleenwort, a more local plant, is *A. angustifolium*, although, in its chosen home, it is usually abundant enough. It seems to select moist, half shaded ravines. The fronds, unlike most of our hardy Ferns, are only once divided. Those which bear the fruit are narrower and generally taller. In the tallest specimens the fronds are about three feet long, of a light green color, and generally three inches wide. It thrives in moist, loamy soil, and prefers some shade. Like most hardy Ferns, it needs time to become established; and plants are generally stronger and finer the second year after setting.

Asplenium ebeneum is a much smaller species than either of those above mentioned. It is seldom more than a foot high, with fronds an inch wide, once divided, and with a black and shiny stem. The fronds are evergreen. It is found on broken, rocky terraces, in the sun or half shaded situations, in crevices of broken rocks. It is, therefore, a rather local plant, though not rare. We have always found it hardy enough, and it surely thrives naturally in exposed situations. It should be valuable in many parts of the rockery on account of its size and shape. Usually, in the larger specimens, the fertile fronds stand erect, with a tuft of smaller sterile ones prostrate about the roots.

Of the Shield Fern (Aspidium) we have in New England about fourteen species and varieties. One of the most common and valuable for ornamental purposes is *A. acrostichoides*. This species, which bears a once divided dark evergreen frond, is inclined to grow in clumps, and fine plants can be grown in either sun or shade. The variety *incisum* is not common, nor do we believe perfectly fixed in character. It is not rare to find plants with some fronds deeply incised, while others are almost or quite free from this. The fronds of this species are thick and durable, usually appearing nearly as fresh in early spring as in autumn.

The Climbing Fern (*Lygodium palmatum*), when once established, is one of the most charming species we have. It seems to transplant best in the spring. Naturally, it grows among low shrubbery, seldom or ever in the open sun, but twining over low bushes, which shade its roots. A moist, loamy soil is needed, with a low trellis to support the slender, twining stalks.

Southwick, Mass. *F. N. Horsford.*

Anthuriums.

THIS highly ornamental genus of tropical plants may be divided into two classes, (1) those varieties characterized by their handsome foliage and (2) those in which the flowers form the most noticeable feature. The members of the latter division have been comparatively few in number, at least in original types, the larger part of the fine-flowered Anthuriums having been of garden origin. The most widely known of the original species is *A. Scherzerianum*, the oblong-lanceolate leaves and bright scarlet spathes of which are familiar to all gardeners. This plant has greatly improved under cultivation, and has produced a number of varieties, as the seedlings vary greatly both in form and size of flowers and foliage. Among the most notable of these are *A. Wardii*, a very large and strong-growing form, both foliage and spathes being particularly broad, and the latter very brilliant in color; *A. Cypheri*, the spathes of which are inclined to crimson in shade; and *A. Rothschildianum*, the last named having bright scarlet spathes, which are usually dotted or marked with white, and it is especially recommended by some growers for its free-flowering qualities.

Anthurium Andreanum is another species in the flowering section, now becoming widely distributed, as it seeds profusely and the seeds germinate readily in a warm house and moist atmosphere. This, like *A. Scherzerianum*, is quite variable when raised from seeds, and some forms thus produced will be found of little value, while others from the same sowing may prove of special merit. *A. Andreanum* is of stronger growth than *A. Scherzerianum*, and in some cases it assumes an almost scandent habit, in which, however, it should not be encouraged, as the flowers are apt to depreciate in quality when the stem of the plant becomes long and straggling.

A. Ferrierense is very much like the last named species in growth and habit, the chief distinction being in the color of the spathe, which is a deep, rosy pink. This variety is not so much of an acquisition as *A. Andreanum*, and has not become a general favorite.

In the other section of the Anthuriums are to be found some with leaves so large and beautifully marked that they are among the choicest ornaments of the tropical house. Prominent in this class is *A. crystallinum*, an extremely handsome plant from tropical America, with very large cordate leaves, the veins of which are marked out by bands of white which remind one of frosted silver.

Somewhat similar in general appearance is *A. magnificum*, a noble species with leaves from two to three feet in length and broad in proportion. The ground color of the leaves is dark olive-green, which offers an admirable contrast for the white veins, and makes this plant one of the most effective for exhibition in a collection of foliage plants. *A. Warocqueanum* is a species of more recent introduction than the preceding, and is well worthy of a place in any good collection. This plant has large cordate-acuminate leaves of bright green, with prominent veins of a lighter shade.

Another handsome plant from South America is *A. regale*, the leaves of which are a rather dull green in color, with white veins, and stand up well on long foot-stalks. *A. regale* is also a strong grower, and if properly treated will produce its large and striking foliage quite rapidly.

As regards soil, all of the Anthuriums require a light, rough compost, a good mixture being equal parts of fibrous peat and chopped sphagnum, with a liberal addition of clean, sharp sand, and some broken charcoal. The drainage of the pots or pans should also be properly attended to by filling them with crocks or other suitable material, for while they enjoy copious waterings during active growth, the Anthuriums are liable to suffer if the soil should become sodden and sour, and the thick, fleshy roots soon rot. They need a warm temperature, sixty-five to seventy degrees at night being most suitable for the species with ornamental foliage, though *A. Scherzerianum* may be grown in a lower temperature successfully. Shading will be found necessary during the summer months, and a moist atmosphere at all times, and in the case of those grown especially for their foliage it is best to remove the flowers as they appear, not only on account of their insignificant appearance, but also to prevent their weakening the plant. Seeds may be sown in a mixture similar to that recommended for potting, and if placed on brick bottom-heat and kept moist, it will germinate in a few weeks. They are best sown as soon as ripe.

Holmesburg, Pa. *W. H. Taplin.*

The Spring Garden.

TWO snow-falls within the last fortnight protected low growing plants through a few days of low temperature, and flowers which were in bloom at the time passed uninjured through what to most people seems a severe trial. Really, however, a blanket of snow is the best possible protection from cold winds and biting frosts, and melting snows seem to stimulate the growth of early growing plants. Is this because of the ammonia contained in snow-water? Many of these plants are alpine, and in their natural stations they flourish close to the edges of the snow-banks as they retreat before the warm, bright sun. Of course any stimulus in the snow water is a minor element compared with the effect of the increasing heat of the sun, the manifestation of which in the annual renewal of growth in the spring is one of the most imposing displays of natural forces. With the increasing light and warmth almost all of the early blooming plants are boldly blooming or rapidly preparing to do so. I noticed this morning that one little Squill, which for weeks had peeped at the level of the ground apparently watching its opportunity, had at last suddenly thrown its bright flowers gaily to their full height. Not so bright, but earlier to bloom than any of the Scillas, is a little Grape Hyacinth from Mount Taurus. This is especially good for the rockery, as the plant is rather diminutive and its color (blue) rather dark in tone for effect on the level. It sends forth its long, narrow foliage in the fall and has been one of the earliest flowers to show color, and yet it opened very slowly. While it has not been injured in any way by frost it seems rather discouraged in bad weather. The flowering scape is only some three inches high.

More cheerful are the Primroses, on which straggling blooms have appeared all winter, though the hybrid varieties, such as we usually grow in the garden, do not pass unscathed either in flower or foliage during severe weather. However, we seldom have bloom until April, and while the foliage may be scorched by frost new leaves are quickly put forth. The plants are perfectly hardy and most accommodating subjects, as they bear shifting without injury, and, provided the clumps are not broken up just before blooming-time, will always give a good crop of flowers. In heavy soil Primroses grow vigorously and I prefer to leave them without protection, as wet is a greater enemy than severe weather. Primulas in bloom are surely among the most pleasing flowers and indispensable in spring

gardening. A stock is easily prepared, as seeds of a good strain (Dean's is as good as any) if sown in April or May will make strong plants before winter, and will bloom the next spring. After blooming they may be separated into single crowns and planted in odd spaces to make growth for another season. Flowers of a good strain, in color white, yellow and many intermediate shades, are an inch or more in diameter, larger than Polyanthus (*P. elatior*) and preferable in many respects. In fact, the average cultivator will find the modern hybrid hardy Primulas quite sufficient for his wants in this family, for while there are some fine "species" a large number are of interest principally to the specialist. Where protection of a frame can be had *P. cortusoides* will be found satisfactory, as it has been much improved in recent years by careful selection. This is a deciduous species, and it is now starting into new growth, the foliage having disappeared in the fall. A frame suitable for alpine Auriculas seems to suit it.

Elizabeth, N. J. *J. N. Gerard.*

Orchid Notes.

Cymbidium eburneum.—Many plants of this desirable Orchid are now in full flower with us, filling the house with their delightful perfume. Even when out of bloom this Orchid, with its finely arching, dark green grassy foliage, is highly ornamental, and the wonder is that it is not more commonly grown. The scapes, which are erect and clothed with large green bracts, bear one or two flowers about five inches across; these are ivory white, of good substance, with a large blotch of orange-yellow on the front of the lip, and numerous spots of crimson on the under surface of the column. *C. eburneum* grows freely in an intermediate temperature if abundance of air can be given. At no time should the plants be allowed to become dry. When not overpotted scarcely too much water can be given. The pots should be well drained, and the soil should consist of two parts of rich fibrous loam to one of well rotted manure, with plenty of sand to keep it open. The thick fleshy roots are great feeders, and as soon as they fill the pots liquid manure should be given two or three times a week. There are two or three named varieties of this species, but none of them are particularly distinct. It was introduced from the East Indies in 1846.

Chysis Chelsonii.—This magnificent hybrid is the result of crossing *C. bractescens* with *C. aurea*, but it is far superior to either of its parents and in every way more vigorous. On strong plants the bulbs are more than eighteen inches long and three inches in diameter at thickest part. The upper portion of the bulbs is clothed with the bases of the long lanceolate leaves. The racemes which appear with the young growth are about one foot long and bear about a dozen handsome flowers of fleshy texture and about three inches across. These are of a nankeen color, with the apex of the segments orange-red. The lip is prettily streaked with red, and the flower lasts a long time. *C. Chelsonii* should be grown in the warmest house, potted in a compost of sandy peat and loam, with a liberal addition of chopped moss and rotten leaves. Abundance of water should be given after the new growth is well rooted with occasional doses of liquid manure. After the growth is fully matured water should be to a considerable extent withheld, and the plant removed to a drier atmosphere.

Lycaste gigantea, as its name implies, is of unusually large growth. The stout, conical bulbs are about six inches high, and surmounted by two or three thin, lanceolate leaves more than two feet long. The scapes, usually five or six in number, appear from the base of the bulb, and with the new growth. They are erect, nearly eighteen inches long and bear a single flower more than eight inches in diameter; the lanceolate acute petals and sepals are yellowish green. The lip is fleshy, purplish brown, beautifully margined and fringed with orange. The large, pure white column is densely clothed with short hairs on the under surface. *L. gigantea* succeeds admirably in a mixture of peat and moss, with a liberal addition of chopped, half rotten leaves. It requires an abundance of water during growth and should at no time be kept dry. It does best with us in the intermediate house—that is, in a temperature of fifty-five to sixty degrees during the winter months, and as cool as possible in summer, with abundance of air. This species was introduced from Central America in 1848, but is not often noted in collections.

Lycaste cruenta, now flowering freely, is of quite a different type from the foregoing. It is deciduous, losing its leaves in early winter, and consequently it should be kept fairly dry in a cool house until the new growths appear. The numerous scapes are about six inches long, bearing a single flower about three inches in diameter. The sepals are greenish yellow, the petals and lip deep orange, excepting a large blotch of crimson at the base of the latter and a few spots of the same color on the base of the former. This is a very free blooming plant, and the flowers—which are fragrant—last quite a long time in perfection and are very useful for cutting. It requires very liberal treatment during growth, but care should be taken not to overpot it. *F. Goldring.*

Kenwood, N. Y.

Iris Susiana.—Of the numerous species of Iris now in cultivation, none are more beautiful than this. Exquisitely delicate is the penciling of the petals, the inner three of which, usually known as standards, are of such a size as to place this species among the largest of the genus, a well developed flower measuring seven inches across. The three outer and lower petals, or falls, are partly clothed with a dense beard, and have a dark brown blotch in the centre of each. This plant is by no means a new one, having been among those cultivated by Gerard and figured in his Herbal three centuries ago. *Iris Susiana* is a native of Mesopotamia and Syria, and it is unfortunately too seldom met with in flower under cultivation. This is probably because its peculiar habits and requirements are not sufficiently understood. *I. Iberica* much resembles *I. Susiana* in this respect, and both belong to a division of the sub-genus Euiris, known as Oncocyclus, so that their botanical and cultural affinity is well marked, and we find them both to succeed well under the same treatment. These Irises are usually imported in autumn in a dried state, together with other flower-roots, and when received they should be potted up in a sandy compost and placed in a cool house or frame, where they will commence to grow at once, and continue to do so through the winter until their flowering season, which is in early spring. They rarely flower, however, the first year. When the weather will permit the plants may be transferred to a well drained soil in the border. In June the leaves die down, and the plants rest until September. During this period of rest English growers place a hand-light over the plants to ripen them by artificial drought. This is not necessary here, owing to the greater amount of sun-heat to which they are naturally subjected. In September growth begins and continues throughout the winter if the plants be lifted in fall, potted and placed in a cool house; and then flowers may be expected in March. It must not be inferred from this that these Irises are not hardy, for we have flowered them in the open ground and expect to do so again. But when their beauty and the simplicity of their culture is considered, it is not too much to ask for them pot-room in a cool house, where they will present a welcome relief to the monotony of Calceolarias and Cinerarias in the spring months.

Passaic, N. J. *E. O. Orpet.*

The Forest.

The Hemlock.

WITH the exception of the White Pine, the Hemlock must be regarded as the most valuable of all the trees of the United States east of the Mississippi River, so far as abundance of timber products up to the present time is concerned.

The wood, for many purposes, especially in the unexposed parts of structures, has no superior, if, indeed, it have any equal. Its capacity for holding nails is greater than that of the White Pine, while its durability is equally great in corresponding exposures. With these qualities in its favor, the Hemlock must be regarded as worthy of careful consideration with reference to its bearing upon the important forestal problems of the nation. In the brief paper I have prepared for the present occasion, I have drawn my matter largely from a report upon the Hemlock, prepared by me for the Forestry Division of the Department of Agriculture, based upon a somewhat extended study of its biology, history and economy.

The wide range of the Hemlock, covering, in its natural distribution, more than one-half million square miles, extending through thirty degrees of longitude and thirteen of latitude, would of itself suggest its adaptation to forestal purposes. The impression received from its distribution is further strengthened in the fact that the tree grows naturally in a considerable diversity of soil, climate and situation. Few trees of our native forest are more marked in this respect, and somewhere within its range it is found as an associate of nearly every species of the arboreal flora of eastern North America north of Alabama. If, however, we examine the question from the stand-point of actual experience in the cultivation of the Hemlock, the matter appears far less encouraging.

I.—The demands which the Hemlock makes in regard to soil and climate are of so general a nature that no obstacle to its cultivation can arise from this consideration, although, like other plants, it manifests a certain preference for particular

situations. Throughout the area covered by its natural distribution there are millions of acres adapted to the highest development of the Hemlock, which are unfit for any other than forestal purposes. No requirements exist, therefore, in regard to soil and climate, which are not amply supplied.

II.—The tendency of the Hemlock to renew itself naturally on areas which have been largely or complely deforested, is less marked than that of most other tree species. Still, the tendency to natural renewal is by no means wanting. The writer has seen a large pasture adjacent to a piece of Hemlock woods well stocked with a growth of young Hemlocks. They bore evidence of having been disturbed by cattle, but there were abundant indications that if left to themselves they would completely reforest the area on which they were growing. Other similar instances have been mentioned by correspondents in numerous locations. The Hemlock is an abundant bearer when once it has reached the fruiting age, although the seed-crops are biennial. The chances for a wide dispersal are enhanced by the structure and hygroscopic quality of the cone. The seeds are shed at different periods, extending from autumn until spring. Fertile seeds have been found in the cones as late as the last of April. The seeds, if favorably placed, germinate freely; the specially favoring conditions being a moderate amount of shade and moisture. The latitude, in this respect, is not great, as any considerable excess of moisture causes the young plants to damp off, while from any great lack of it they wither and perish. While the young plants must be regarded as exceedingly delicate, they are, nevertheless, capable of enduring a considerable range of climatic and other conditions. There seems to be no inherent reason in the nature and constitution of the Hemlock to operate against its natural renewal on areas from which it has been removed, provided the conditions are favorable to that end. The essential conditions are twofold: First, the rigid exclusion of all domestic animals; second, obviously and chiefly, the prevention of forest fires. While these conditions apply to all tree species in common with the Hemlock, they are relatively of greater importance in regard to the latter on account of its constitutional delicacy. A third condition would be the removal of a certain proportion of the seedlings of other species which are endowed with a greater degree of vigor.

III.—In regard to the cultivation of Hemlock in nursery rows for subsequent transplanting, practical experience shows its want of adaptation to this purpose. In its seedling state it is probable that no other tree species is of so slow growth; at the end of its first year a seedling is rarely more than an inch in height; and at the end of its third or fourth year it has increased to scarcely more than three or four inches. This low growth is characteristic of the Hemlock during many subsequent years, although at a later period the relative rapidity of growth is somewhat increased. While these facts materially lessen the adaptability of the Hemlock to forestal purposes, they do not prevent the employment of the Hemlock in the renewal of forests in the method previously considered. Moreover, it should be stated that while the rate of growth here indicated is based upon my own experience and observation, and is confirmed by many correspondents who have had large experience in the cultivation of the Hemlock, there are a few correspondents who consider it to be, in specially favored situations, as rapid a grower as most other conifers.

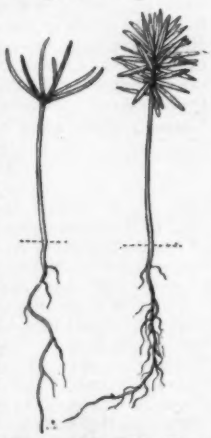

Fig. 29.—Seedling Hemlocks, one and three years old, natural size.

IV.—A few facts concerning the consumption of the products of the Hemlock may be here noted. What are regarded as trustworthy estimates, place the amount of bark used for tanning purposes in 1887 at 1,200,000 tons, which, at eight dollars per ton, would represent a value of $9,600,000. Estimating the amount of manufactured lumber at 1,500 feet per ton of bark, would give 1,800,000,000 feet as the total amount, representing a value, at twelve dollars per 1,000 feet, of $21,600,000. While a considerable portion of the peeled timber is wasted, and should be deducted from the above estimates, it is believed this amount is made good by the use of unpeeled timber for railway ties, fuel and various other purposes. It may, therefore, be estimated that the full value of the products of the Hemlock is, in round numbers, $30,000,000 per annum. The length of time during which our remaining Hemlock forests will continue with this annual drain upon them is, of course, uncertain; but the most careful and conservative observers consider that the present supply could not be maintained for a period exceeding twenty or twenty-five years. It becomes, therefore, a question of great practical importance as to the way in which the existing demands upon the Hemlock shall be hereafter supplied. These supplies can, of course, be afforded in only two ways: First, by the substitution of corresponding products from other trees or other sources; Second, by the renewal of the Hemlock forests.

The general conclusions which have been arrived at as the result of a somewhat careful investigation of the present subject may be briefly summed up as follows: The Hemlock has been, from the earliest settlement of the country, a tree of vast economic importance to the people of the eastern and northern states; that in this respect it has been second to none of our native forest trees, with a possible exception of the White Pine; that the tree has been exhausted from vast areas where it formerly existed in great abundance; that at the present rate of consumption the entire supply will be practically exhausted in from twenty to thirty years; that nothing has been anywhere done toward reforesting the areas from which it has been removed, and that its nature and constitution afford only a moderate promise of its adaptation to economic forestal purposes. Finally, it may be stated that the most prominent result of the investigation to which I have referred has been to give great emphasis to the fact, not as yet sufficiently recognized, that the country ought to give prompt and energetic attention to the whole subject of forestry, that no successful forestal management is possible in the absence of adequate knowledge of the subject, and that this knowledge is attainable only through intelligent experiment, experience and study.—*Read before the American Forestry Association by Professor A. N. Prentiss.*

Correspondence.

Hollyhock Diseases.

To the Editor of Garden and Forest:

Sir.—So much has been said about the true Hollyhock disease (*Puccinia malvacearum*, Mont.) that it is only fair to call attention to another one. Last year, in and around New Brunswick, New Jersey, it was almost impossible to find a single healthy Hollyhock among the thousands of plants. At first the lower leaves began to exhibit large circular brown patches, sometimes bounded upon the side toward the centre of the leaf by the veins, thus giving an angular outline. Soon after the largest leaves of all suffered and fell, and by the middle of August whole rows of the plants exhibited leafless stems. Few gardeners now have any plants, but one enterprising propagator has a long row of fair-sized seedlings in pots. When I first saw these seedlings they were—a few hundred of them—in a box under sash, and so badly infected with the blight that there seemed at first to be no hope for them. Perhaps one plant in five was saved and pricked out in a fresh box; and the following remedy was applied almost daily: Three ounces of carbonate of copper were dissolved in a quart of standard ammonia, and afterward diluted to twenty-two gallons with water. At the same time the older leaves which developed the spots were removed and burned, until a comparatively healthy condition has been reached. The disease is due to a Cercospora and probably *C. althæina*, Sacc., a species which in its various forms grows upon the common Mallow (*Malva rotundifolia*), Velvet-leaf (*Abutilon Avicennæ*) and a species of Callirhoe.

As said in the beginning, too much credit should not be given to the Hollyhock rust (*P. malvacearum*) that has come to us from abroad while we have a blight of our own to attend to, even if it is one that can be kept in check perhaps if taken in time by using a compound of copper.

Rutgers College. *Byron D. Halsted.*

Grafting.

To the Editor of Garden and Forest:

Sir.—I do not think Mr. Parsons goes quite to the bottom of this question of grafting (see p. 44). My view of the question is that if any conifer will not grow in America or in Europe without grafting, it is not worth cultivation at all. Grafting for timber-trees will never pay. The plain fact is that own-rooted fruit-trees have never, or very, very rarely, been tried side by side with the grafted ones, and until this is done no one really can know that grafting is the best, or even one of the best ways. One would have thought that our horticultural societies, or those botanists who profess to know something of vegetable

physiology, would have settled this simple question of grafting, or of stocks versus own roots, long ago. But not a bit of it; in point of fact, the scientific people do not know as much as the practical gardener in this matter, and even the gardener is too often led by custom, or he does what is usual, rather than undertake original research for himself. Knight long ago formulated the axiom that the best form of vegetative restriction or pruning to which a fruit-tree could be subjected was a heavy crop of fruit.

It has been well said that every red deer shot in Britain costs at least fifty pounds, every pheasant at least a guinea, and in many private gardens the peaches are not grown for less than five shillings apiece! I lately saw some Peach-trees as grafted on Plum stocks. They are half-standards in a vinery and the Peach scion is vainly protesting against starvation by trying to root out all around the swollen point of the so-called "union" between scion and stock! The Peach-tree on its own roots grows as freely as a Willow, and if any restriction is wanted we have half a dozen ways at least, each and all more efficient than grafting.

Grafting has become a sort of fetish with many propagators. Nature at her best is ahead of even the most successful gardener, and she does not graft her productions. The Grapes of Alicante or Cashmere are not grafted, and I have yet to learn that they have been surpassed in our gardens. So also the Peaches of Persia and the Apricots of Thibet, of which travelers rave when eating the finest grafted produce of the west. That finest in flavor of all Pears, the American Seckel, was a chance seedling and not grafted, and I have never heard of a grafted tree that could surpass the original one as discovered by "Dutch Jacob" near the Delaware. The original tree of the Ribston Pippin Apple was an ungrafted seedling, and a root-sucker from it is alive to-day, but I do not know of any grafted fruit-tree in Britain a century old, and for every thousand of grafted conifers alive, and very often stunted and unhappy, in Britain to-day, there is reliable evidence to prove that at least ten times that number have proved to be disappointing failures.

Botanical Gardens, Trinity College, Dublin. *F. W. Burbidge.*

Grafting Oaks.

To the Editor of GARDEN AND FOREST:

Sir.—It has always been thought that the grafting of American Oaks on stock of European species, a difficult operation to perform in some respects, could not make long-lived trees and that this was especially true of *Quercus coccinea* and *Q. rubra*. Moreover, as the acorns of several varieties have been imported in quantity during the past century, it was easy and natural to secure them, and therefore but little grafting was done. I have noted a remarkable exception to this, however, near Potsdam, the Prussian Versailles. The marble palace stands on the borders of a lake in which are mirrored masses of foliage from the surrounding trees in a beautiful park still called "The New Garden," although it is now a hundred years old. Laid out at a time when the interest in American trees, then newly introduced, was at its height, this royal garden is rich in foreign varieties of forest trees, which are now in fine condition, as perhaps will be remembered by you and Mr. C. A. Dana, with whom it was my good fortune to visit this spot. Near the library, standing apart from other trees, there is to be found a remarkably fine specimen of *Q. rubra*, grafted upon our *Q. Robur*, for which our name is Steineiche. This interesting tree is thirty-three feet in height, with a circumference of six feet seven inches. The graft was made at the height of thirteen feet, and what makes the appearance of the tree peculiar in winter is the fact not only that the bark of the top is much smoother than that of the trunk below, but because the top is entirely leafless, while at the same time the branches which have been put forth below the graft still hold their leaves, though browned and shriveled by the winter.

M. Reuter, head gardener at Peacock Island, first called my attention to this tree. The establishment of this park at Potsdam dates back just a century, that is, from the commencement of the short and brilliant reign of Frederic William II., the successor of the great Frederic. If, as is reasonable to suppose, this tree was among the earliest planted, its age must be estimated at from 90 to 100 years. In this case the durability of the graft could not be better demonstrated.

Berlin. *C. Bolle.*

The Study of Botany.

To the Editor of GARDEN AND FOREST:

Sir.—I am glad you advocate the study of botany for the young, as it gives them an interest in natural objects which may be a source of pleasure to them through life.

Perhaps my experience with my own little girl may interest you. Three years ago, when she was nine, I made up a class of children of about her age, and engaged a botanist to give them lessons twice a week during the summer. These lessons were much enjoyed by the children, who always looked forward to them with pleasure. The interest which they took in flowers was greatly increased, and this added much to the pleasure of their walks. Their powers of observation and discrimination were increased, and the technical names did not seem to present any difficulties.

We spent last summer in Switzerland, where the vegetation was a constant source of pleasure to the children, so that the journeys, which are apt to be tiresome to young persons, were made delightful to them, by their finding and collecting flowers.

This winter, of their own accord, they have taken up the study of mineralogy, which interests them as much as botany.

It seems to me that the study of the natural sciences is better fitted for the education of young children than most of the branches taught in schools. One great advantage they certainly have; the children become fond of study and investigation, their education becomes a pleasure, and their faculties are more evenly developed than by those studies which exercise little besides the memory.

Highland Falls, N. Y. *P.*

Orchids at Easton, Pennsylvania.

To the Editor of GARDEN AND FOREST:

Sir.—Early last month I paid a visit to the greenhouses of J. Eyerman, Esq., College Hill, Easton, Pennsylvania, where almost always there may be seen a number of choice Orchids in bloom. Phalænopses in five varieties were finely in flower, including a beautiful dark rose colored and well shaped *P. Sanderiana*, but noticeable above all was a magnificent and substantial variety of *P. grandiflora*—the old Java form. The spike carried six enormous and very compact blooms, measuring more than four inches from petal to petal and three and three-fourths inches in depth. This may be considered a gem amongst Phalænopses.

The genus Cypripedium finds special favor in the eyes of Mr. Eyerman, and there may be seen in flower and bud the following kinds: *C. Boxalli*, *C. villosum*, *C. Harrisianum*, *C. nitens*, *C. Lowii*, a fine variety of *C. plunerum*, several specimens of *C. Argus*, including one extra-broad petaled and highly colored form; *C. hirsutissimum*, *C. cardinale*, *C. callosum*, *C. bellatulum*, *C. Parishii*, *C. grande*, *C. Dayanum*, *C. Danthieri*, *C. chloroneurum*, *C. caudatum*, *C. Crossianum* and numerous plants of *C. Lawrenceanum*.

Cattleyas and Dendrobiums, in great variety, were in bloom with *Lycaste Skinneri*, including a fine plant of the always rare and lovely variety, Alba, bearing six flowers, a grand specimen of *Cymbidium Lowianum*, several of *Cymbidium eburneum*, and the attractive *Lælia harpophylla*. Odontoglossums and Oncidiums of many kinds were flowering well, and last, but not least, I noted a handsome plant of the deliciously fragrant little Orchid, *Dendrochilum glumaceum*, with some seventy spikes of flowers.

New York. *E. V. L.*

Notes.

The international botanico-geographical exhibition which was to have been held at Antwerp during the coming summer has been postponed until 1891.

Thirty-three pages of the last number of the *Kew Bulletin*, in double columns, are taken up with a list of hardy herbaceous plants, shrubs and trees, the seeds of which may be had by way of exchange from the Royal Gardens at Kew.

In an article on "The History of Garden Vegetables," published by Dr. E. L. Sturtevant in the *American Naturalist*, he includes the Nightshade (*Solanum nigrum*), saying that "in the Mississippi Valley the little black berries are made into pies and other pastry."

The last report of the Park and Garden Department of the city government of Berlin shows that during the past year $84,473 had been expended upon the nurseries and forest-plantations where material is grown for use in the streets and parks of the town.

Mr. A. L. Kean, writing in the *Botanical Gazette*, states that, from experiments made by himself, he believes the disease which since 1885 has seriously affected the Lily plantations of Bermuda is due to the same species of Botrytis which has afflicted *Lilium candidum* in England.

At a recent meeting of the Royal Horticultural Society in London a plant of *Masdevallia Tovarensis* was exhibited which bore 255 leaves and 162 flower-spikes with 346 open blossoms. When the exhibitor, Mr. Hodgson, bought the plant fifteen years ago it bore only two small leaves.

It appears from a London letter in *The Sun* that Madagascar has gone into the lumber business. The first cargo from that country reached England a fortnight ago, and the wood made a favorable impression on experts. It consisted entirely of hard woods, which resembled mahogany, walnut and teak, and commanded good prices.

Phalænopsis Cynthia × is recently described as a new natural hybrid affined to *P. leucorrhoda*, also supposed to be a natural hybrid. The only difference between the two is that the tendril-like appendages to the labellum are only about half as long in the former as in the latter, and in *P. Cynthia* there is a slight tinge of yellow on the front lobe of the lip.

The fruit-growers of southern California have found that a crop of Peanuts can be raised between the trees of a young orchard with no loss to the trees if the vines are left to decompose in the soil. The Peanuts net from five to eight cents a pound, which means from $125 to $200 an acre. This makes a good revenue from the land until the fruit-trees come into bearing.

The Sugar-cane disease which started three or four years ago in plantations near Cheribon, Java, is said to be spreading with alarming rapidity. At a recent congress of planters and others interested in the production of sugar, a fund of $90,000 was subscribed to engage a bacteriologist to come from Europe, investigate the cause of this disease, and if possible devise a remedy.

A San Diego paper announces that an "herb garden" of some ten acres in extent is to be established near that city by Mr. Augustus Lang. Plants particularly valuable for their medicinal qualities, and, perhaps, flowers especially desirable for their perfume, are to be cultivated. A laboratory is to be erected for the treatment of the herbs and flowers grown, so that essential oils and extracts, as well as dried herbs, will be prepared for the drug market.

It is computed that 100,000 trees have been planted in the streets of Paris, exclusive of those which adorn the larger squares and parks. The kinds chiefly used are the Ailanthus, the Norway and the Sycamore Maple, the Horse-chestnut, the Elm, the Locust, the Occidental Plane (Buttonwood), the Silver Linden and the Paulownia. Such care is taken to provide a sufficiency of good soil that the cost of setting out a single tree reaches $61, and $50,000 are annually expended for the purpose.

Mr. S. E. Jelliffe has caused to be reprinted in separate shape the catalogue of the plants growing in Prospect Park, Brooklyn, which he originally published in the *Brooklyn Daily Eagle Almanac*. It includes, of course, many foreign as well as native plants, and the list embraces 286 flowering plants and sixty-two cryptogams. Among the latter one would, perhaps, have expected to find more than nine species of Ferns. It will be a pity if this list is not placed on sale somewhere in the park, and the example set by its author might advantageously be imitated by students in this and other cities.

Some analyses of apples, made at different periods of their growth, under direction of Mr. J. W. Clark, horticulturist of the Missouri Experiment Station, shows that much the greater proportion of the ash, or material drawn from the soil, is stored up in the early part of the growth of the fruit. This gives an additional reason for thinning early, or as soon as wormy or imperfect specimens can be distinguished. It shows, also, that a barrel of large and perfect apples takes a smaller amount of mineral plant-food from the soil than a barrel of small, inferior fruit. The analysis shows that the apples on an acre of ground, where the trees stand thirty feet apart, and yield ten bushels of fruit to the tree, take from the soil more than seven pounds of phosphoric acid and forty-three pounds of potash. This justifies the use of bone-dust and ashes, or one of the potash salts, as a dressing for orchards.

Writing in the March *Bulletin of the Torrey Botanical Club* with regard to a collection of Sedges sent him from Phœnix, Keweenaw County, Michigan (a spot on the western side of a small peninsula which juts into Lake Superior from the southward), Professor L. H. Bailey says that in all regions adjacent to the Great Lakes the flora is anomalous. "It presents a curious mixture of northern and southern types, yet the northern types are not particularly marked." There is "a tendency of the southern types to creep northward along the Great Lakes, particularly on the shores opposite the direction of the prevailing winds. These winds, traversing the warmer area of the water, maintain the winter temperature on the shores upon which they blow at a higher point than it reaches on the opposite side. Thus it appears to be true that the flora of the eastern shore of Lake Michigan has in it more plants of a southern type than the western shore; at any rate, it is true that the western shore of the state of Michigan presents in its flora a warmer cast than does the eastern shore of the state." The most interesting entry in the list of sixty-four Carices is *C. exilis*, for which the most western locality hitherto known has been Wayne County, western New York, and which, even in the east, is a rare species.

A picture of the Washington Memorial Arch as it is to be built in marble, which was recently given in the *Sun*, shows many changes from the much admired wooden prototype. The piers are much more massive and the span of the arch relatively smaller, while the distribution of the ornamental motives is also quite different. Of course, the proportions suitable for a wooden construction could not have been exactly adhered to, and we may trust its designer to believe that greater beauty will spring from his modifications as well as greater stability. It was first proposed to place the arch in a line with the external boundary of Washington Square, but it has been decided to set it back half way between this point and the open central space. In this way the large trees near the street will not need to be removed, and, moreover, a dignified approach to the arch can be made by forming an open space in front of it with, it is suggested, a pair of isolated ornamental shafts bearing appropriate emblems. Some such treatment is certainly desirable if there is to be true harmony between the stately memorial and its surroundings. The sum raised for building it now amounts to $75,000, but $150,000 ought to be raised if the architectural beauty of the work is to be properly enhanced by sculptured decoration.

A correspondent of *The Garden*, London, gives some interesting notes on synonyms among Chrysanthemums. For instance, in 1886 Messrs. Cannell exhibited several new varieties imported direct from Japan, and which they distributed the following year. Among those which received a first-class certificate, and which was indeed quoted at a higher price than any other, was Mrs. H. Cannell, with beautiful pure white flowers. Now, this is by all growers (Messrs. Cannell included) regarded as synonymous with Christmas Eve, a variety distributed by the American nurserymen, and sent to this country two years previous to the distribution of the other, viz., in 1885. Another flower is Lady Trevor Lawrence, which is the same as Mrs. Beale and Robert Bottomley, this last coming from the other side of the Atlantic. Several other instances are recorded in different catalogues of the same variety being distributed by an English and an American nurseryman under different names. Included among the number are Mr. Frank Thompson and W. G. Drover, Marvel and Mr. H. Wellam, Charlie Sharman and W. M. Singerly, Mrs. Vannamann and Mr. Addison, with Mrs. J. N. Gerard and Mrs. Dunnett. All this is, no doubt, to be accounted for by the fact that they have been imported direct from Japan, and, therefore, the identical varieties have been distributed on the two continents.

Catalogues Received.

C. E. Allen, Brattleboro, Vt.; Seeds and Plants.—P. J. Berckmans, Fruitland Nurseries, Augusta, Ga.; Green-house, Bedding and New Plants.—Joseph Breck & Sons, 51, 52 and 53 N. Market St., Boston, Mass.; Vegetable and Flower Seeds, Plants, Implements, etc.—J. G. Bubach, Princeton, Ill.; Strawberries.—Wm. Bull, 536 King's Road, Chelsea, London, S.W., England; Flower and Vegetable Seeds, Bulbs, etc.—Luther Burbank, Santa Rosa, Sonoma Co., Cal.; Novelties, Plants, etc.—W. Atlee Burpee & Co., 475 and 477 N. 5th St., Philadelphia, Pa.; Flowers, Plants, Thorough-bred Live Stock, etc.—Paul Butz & Sons, New Castle, Pa.; Florists' Stock.—Alfred E. Cole, Plainfield, N. J.; Garden, Field and Flower Seeds, etc.—M. Crawford, Cuyahoga Falls, O.; Strawberry Plants.—J. M. Edwards & Son, Fort Atkinson, Wis.; Small Fruit Plants, etc.—Wm. Elliott & Sons, 54 and 56 Dey St., N. Y.; Seeds.—Z. De Forest Ely & Co., 1303 Market St., Philadelphia, Pa.; Seeds, etc.—J. Roscoe Fuller & Co., Floral Park, N. Y.; Seeds, Bulbs and Plants.—J. C. Giddings & Co., Rutland, Vt.; Northern Grown Seeds.—Gillett & Horsford, Southwick, Mass.; Wild Flowers, Shrubs, etc.—Haage & Schmidt, Erfurt, Germany; Novelties of Seeds.—Higganum Manufacturing Corporation, 189 Water St., N. Y.; Seeds and Agricultural Implements.—G. D. Howe, North Hadley, Mass.; Potatoes.—T. S. Hubbard Co., Fredonia, N. Y.; Grape Vines.—Johnson & Stokes, 217 Market St., Philadelphia, Pa.; Horticultural Supplies.—Thomas Jackson, Portland, Me.; Fruit Trees, Evergreens, etc.—Geo. S. Josselyn, Fredonia, N. Y.; Grape Vines, Small Fruit Plants, etc.